

TITLE OF THE INVENTION

**HEAD DRUM ASSEMBLY MOUNTING STRUCTURE ON A DECK OF A
TAPE RECORDER**

CLAIM OF PRIORITY

[0001] This application makes reference to, incorporates the same herein, and claims all benefits accruing under 35 U.S.C. §119 from my application entitled *HEAD DRUM ASSEMBLY MOUNTING STRUCTURE ON A DECK OF A TAPE RECORDER* filed with the Korean Industrial Property Office on 24 January 2000 and 14 October 2000 and there duly assigned Serial No. 2000/3254 and 2000/60519.

BACKGROUND OF THE INVENTION

Field of the Invention

[0002] The present invention relates to a head drum assembly, and more particularly to a head drum assembly mounting structure on a deck of a tape recorder.

Description of the Background Art

[0003] Generally, a tape recorder such as a camcorder, VCR, or the like has a fast rotating head drum assembly mounted on a main base of a deck. The head drum assembly includes a magnetic head which scans a traveling magnetic tape for information recording/reproducing.

1 [0004] As shown in FIG. 1, a conventional head drum assembly 20 includes an upper drum 21 and
2 a lower drum 22. The upper drum 21 and lower drum 22 are disposed on a same shaft 23, in a
3 manner that the upper drum 21 is rotatably supported by the shaft 23, and the lower drum 22 is fixed
4 to the lower portion of the upper drum 21. The head drum assembly 20 constructed as above, usually
5 employs a Helical scanning type in which the head drum assembly 20 is slanted on a predetermined
6 slant with respect to the main base 10 of the deck to stably guide the running of the magnetic tape.

7 [0005] The Helical scanning type head drum assembly 20 includes a guide groove 22a formed on
8 an outer circumference of a lower end of the lower drum 22. Ends of a plurality of brackets 24 are
9 inserted in the guide groove 22a in a manner of being spaced from each other by a uniform distance.
10 In this situation, the lower drum 22 and the other ends of the brackets 24 are mounted on the drum
11 base 11 of the main base 10. The other ends of the brackets 24 are fastened to the drum base 11 by
12 a screw (S). A reference numeral 22b refers to a lead line, which is an outer circumference of the
13 lower drum 22 stepped to guide the traveling of the magnetic tape. Also, reference numeral 25 is a
14 drum boss received in a central opening of the drum base 11, and S1 is a coupling hole formed in
15 the brackets 24.

16 [0006] As shown in FIG. 2, the drum base 11 is a ring type rib, for example, having an opening
17 formed in the center thereof, three screw coupling holes S2 formed therein at a uniform distance
18 from each other, and a pair of positioning pins 11a and 11b.

19 [0007] FIG. 3 is a sectional view taken on line III-III of FIG. 2. The drum base 11 is usually
20 integrally formed with the main base 10 by proper processes such as a drawing, or the like, on a
21 predetermined slant with respect to the main base 10.

1 **[0008]** The pair of positioning pins 11a and 11b stand substantially in a perpendicular relation
2 with the slant plane of the drum base 11. The positioning pins 11a and 11b determine the mounting
3 position and posture of the lower drum 22 which is mounted on the drum base 11, by a
4 complementary connection with a positioning hole (not shown) formed in a lower surface of the
5 drum boss 25. Accordingly, screw coupling holes (S1 and S2) of the drum base 11 and the brackets
6 24 are aligned with each other, permitting the screw (S) to pass therethrough and fasten.

7 **[0009]** In the conventional head drum assembly mounting structure, however, due to the brackets
8 24 that press the lead line 22b while the drum base 11 and the brackets 24 are fastened by the screw
9 (S), the lead line 22b of the lower drum 22 is often deformed.

10 **[0010]** Further, in order to insert one ends of the brackets 24 to the lower drum 22, many processes
11 are required, such as a process of processing the guide groove 22a for receiving one ends of the
12 brackets 24, and also many parts such as three brackets 24, the screw (S) and the pair of positioning
13 pins 11a and 11b, or the like. Accordingly, due to deteriorated assembly efficiency and increased
14 manufacturing cost, the productivity is deteriorated.

15 SUMMARY OF THE INVENTION

16 **[0011]** The present invention has been made to overcome the above-mentioned problems of the
17 related art, and accordingly, it is an object of the present invention to provide a head drum assembly
18 mounting structure on a deck base of a tape recorder capable of accomplishing a cost effectiveness
19 by decreasing a number of parts and improving an assembly efficiency, and also establishing a
20 quality stabilization by basically preventing any damage to a lead line of a lower drum during an

1 assembly process.

2 **[0012]** The above object is accomplished by a head drum assembly mounting structure on a deck
3 base of a tape recorder according to the present invention, including a head drum assembly including
4 an upper drum, a lower drum, and a drum boss, all of which being connected to a same shaft; a drum
5 base slanted on a main base of a deck; and a positioning and connecting means for determining a
6 relative position of the drum base and the drum boss while complementarily connecting the drum
7 base with the drum boss.

8 **[0013]** The positioning and connecting means includes at least one positioning hole and at least
9 one first coupling hole formed in a lower portion of the drum boss; a positioning pin formed on the
10 drum base to be inserted in the positioning hole; and a second coupling hole formed in the drum base
11 corresponding to the first coupling hole, for receiving a coupling member.

12 **[0014]** According to another aspect of the present invention, the positioning and connecting means
13 at least one locking hole formed in a lower portion of the drum boss; and a hook pin formed on the
14 drum base corresponding to the locking hole for being complementarily connected with the locking
15 hole.

16 **[0015]** The above object is also accomplished by a head drum assembly mounting structure on a
17 deck base of a tape recorder according another embodiment of the present invention, including a
18 head drum assembly including an upper drum and a lower drum, both of which being connected to
19 a same shaft; a slant boss formed on a lower portion of the lower drum for supporting the head drum
20 assembly to be slanted with respect to a main base of a deck for a surface-contact between the head
21 drum assembly and the main base of the deck; and a connecting means for connecting the main base

1 and the slant boss.

2 **[0016]** According to an aspect of the present invention, a positioning means is provided for
3 determining a connecting position of the head drum assembly by a complementary connection
4 between the main base and the lower drum. The positioning means includes a plurality of positioning
5 holes formed in the main base; and a plurality of guiding bosses protruding from a lower portion of
6 the lower drum by different lengths, corresponding to ++the plurality of positioning holes, to be
7 inserted and supported in the plurality of positioning holes.

8 **BRIEF DESCRIPTION OF THE DRAWINGS**

9 **[0017]** A more complete appreciation of the invention, and many of the attendant advantages
10 thereof, will be readily apparent as the same becomes better understood by reference to the following
11 detailed description when considered in conjunction with the accompanying drawings in which like
12 reference symbols indicate the same or similar components, wherein:

13 **[0018]** FIG. 1 is a schematic sectional view showing a head drum assembly mounting structure
14 of a conventional tape recorder;

15 **[0019]** FIG. 2 is a schematic plan view showing a drum base of FIG. 1;

16 **[0020]** FIG. 3 is a schematic sectional view taken on line III-III of FIG. 2;

17 **[0021]** FIG. 4 is a schematic sectional view showing a head drum assembly mounting structure
18 of a tape recorder according to a first preferred embodiment of the present invention;

19 **[0022]** FIG. 5 is a schematic plan view showing a drum base of FIG. 4;

20 **[0023]** FIG. 6 is a schematic plan view taken on line VI-VI of FIG. 5;

1 **[0024]** FIG. 7 is a sectional view showing a modified example of the main portion of the present
2 invention;

3 **[0025]** FIG. 8 is a schematic sectional view showing the head drum assembly mounting structure
4 of a tape recorder according to a second preferred embodiment of the present invention;

5 **[0026]** FIGS. 9 and 10 are, respectively, a bottom view and a perspective view of the lower drum
6 of FIG. 8;

7 **[0027]** FIG. 11 is a schematic side elevation for explaining a modified example of the main
8 portion of the present invention;

9 **[0028]** FIGS. 12 and 13 are, respectively, a bottom view and a perspective view of the modified
10 example of the main portion of FIG. 11;

11 **[0029]** FIG. 14 is a schematic side elevation for explaining another modified example of the main
12 portion of the present invention; and

13 **[0030]** FIG. 15 is a lower perspective view showing the lower drum of FIG. 14.

14 **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

15 **[0031]** The present invention will now be described in greater detail with reference to the
16 accompanying drawings.

17 **[0032]** As shown in FIGS. 4 through 6, in the head drum assembly mounting structure of a tape
18 recorder according to the first preferred embodiment of the present invention, a drum boss 230
19 integrally formed with a lower portion of a lower drum 220 of a head drum assembly 200 is mounted
20 on a drum base 110 and fastened by a screw. Here, the drum base 110 is integrally formed with a

1 main base 100 while being slanted with respect to the main base 100.

2 [0033] The main aspect of the present invention is a positioning and connecting means, which is
3 provided to the drum base 110 and the drum boss 230, for determining a relative connecting position
4 of the drum base 110 and the drum boss 230 by a complementary connection.

5 [0034] The positioning and connecting means includes two or three first screw holes 231 formed
6 in a lower portion of the drum boss 230, one positioning hole 235, two or three second screw holes
7 S3 penetrated into the drum base corresponding to the first screw holes 231 for permitting the screw
8 (S) to pass therethrough, and a positioning pin 111 formed on the drum base 110 corresponding to
9 the positioning hole 235. Throughout the description of the present invention, the like elements are
10 designated by the same reference numerals.

11 [0035] Meanwhile, according to another aspect of the present invention, an end of the shaft 240
12 protruding downward from the drum boss 230 also serves the function of the positioning and
13 connecting means through the cooperation with a shaft hole 112 formed in the drum base 110. More
14 specifically, when the drum boss 230 of the head drum assembly 200 is mounted on the drum base
15 110, the insertion of the lower end of the shaft 240 into the shaft hole 112 of the drum base 110
16 determines an initial connecting position.

17 [0036] When the drum boss 230 of the head drum assembly 200 is mounted on the drum base 110,
18 in addition to the insertion of the lower end of the shaft 240 into the shaft hole 112 of the drum base
19 110, the positioning pin 111 is also inserted in the positioning hole 235, and accordingly, the first
20 screw holes 231 and the second screw holes S3 are aligned with each other, permitting the screw (S)
21 to pass therethrough and fasten. In order to accomplish such fastening of the screw (S), the relative

1 positions of the positioning hole 235, the first screw holes 231, and the second screw holes S3 are
2 determined in advance during processing.

3 [0037] Accordingly, by upwardly inserting, i.e., fastening the screw (s) into the first screw holes
4 231 formed on the lower portion of the drum base 110, the head drum assembly 200 is directly
5 mounted on the drum base 110 of the main base 100.

6 [0038] FIG. 7 shows the positioning and connecting means of another preferred embodiment of
7 the present invention. The positioning and connecting means includes at least one locking hole 235'
8 formed in a lower portion of the drum boss 230, and a hook pin 115 formed on the drum base 110
9 corresponding to the locking hole 235' for a complementary connection with the locking hole 235'.

10 [0039] The hook pin 115 includes a pair of locking ends 115a and 115b branched from a leading
11 end of the hook pin 115 and elastically biased in opposite directions, and a locking portion 235'a
12 extending from an inner circumference of the locking hole 235' to be locked with the pair of locking
13 ends 115a and 115b.

14 [0040] When the hook pin 115 is inserted in the locking hole 235', the locking ends 115a and
15 115b of the hook pin 115 are pressed by the inner circumference of the locking hole 235' and
16 advanced toward the locking portion 235'a of the locking hole 235' until the locking ends 115a and
17 115b are biased outward and locked in the locking hole 235'.

18 [0041] As described, since the hook pin 115 can serve both as a positioning pin and as a screw,
19 the initial connecting position of the drum boss 230 and the drum base 110 is determined, while the
20 connection is made by one step during the connection of the drum boss 230 and the drum base 110.

21 [0042] Meanwhile, although the embodiments of the present invention depict the screw (S) and

1 the screw holes S3 and 231, or the hook pin 115 and the locking hole 235' as the connecting means
2 for connecting the drum boss 230 and the drum base 110, it should be noted that other proper types
3 can also be applied without limitation.

4 [0043] Further, the position of the screw and the screw holes, and the hook pin and the locking
5 hole is interchangeable. That is, the screw can be formed on a lower portion of the drum boss 230,
6 while the corresponding screw hole is formed in the drum base 110. Likewise, the hook pin also can
7 be formed on a lower portion of the drum boss 230, while the corresponding locking hole is formed
8 in the drum base 110.

9 [0044] FIGS. 8 through 10 show a mounting structure of the head drum assembly according to a
10 second preferred embodiment of the present invention. Throughout the description, the like elements
11 will be designated by the same reference numerals.

12 [0045] Referring to FIGS. 8 through 10, in the head drum assembly mounting structure according
13 to the second preferred embodiment, a slant boss 250 integrally formed with a lower portion of the
14 lower drum 220 is coupled with the main base 100' by surface-contact. Accordingly, the head drum
15 assembly 200' is slant-supported on a main base 100'.

16 [0046] The main base 100' and the slant boss 250 respectively include a plurality of connecting
17 holes S3 and 251 corresponding to each other. By fastening a screw (S) into the connecting holes S3
18 and 251, the main base 100' and the slant boss 250 are coupled with each other.

19 [0047] A positioning means is provided to the main base 100' and the lower drum 220, to
20 determine the mounting position of the head drum assembly 200' through a complementary
21 connection.

1 **[0048]** It is preferable that the positioning means includes a plurality of positioning holes S4
2 formed in the main base 100', and a plurality of guiding bosses 261 and 262 protruding from a lower
3 portion of the lower drum 220 by different lengths for being inserted in the positioning holes S4.

4 **[0049]** The guiding bosses 261 and 262 support the head drum assembly 200' on the main base
5 100' in a bridge pattern, while maintaining a predetermined slant of the head drum assembly 200'
6 with respect to the main base 100'. As shown in FIGS. 9 and 10, different lengths of the guiding
7 bosses 261 and 262 correspond to the varying length of the slant boss 250. The guiding bosses 261
8 and 262 includes positioning pins 261a and 262a protruding from the ends thereof. The positioning
9 pins 261a and 262a serve as the positioning means by being inserted in the plurality of corresponding
10 positioning holes (S4) formed in the main base 100'.

11 **[0050]** According to the above embodiment, the head drum assembly 220' is mounted on the main
12 base 100', in a state that the positioning pins 261a and 262a formed on the ends of the guiding bosses
13 250 and 260 are aligned with the positioning holes (S4) of the main base 100'. Here, the plurality
14 of connecting holes S3 and 251 formed on the main base 100' and the slant boss 250 are also aligned
15 with each other. In this situation, the screw (S) is fastened into the plurality of connecting holes S3
16 and 251 upwardly from the lower portion of the main base 100', and accordingly, the head drum
17 assembly 200' is completely mounted.

18 **[0051]** According to another aspect of the present invention, the screw (S) can also be fastened
19 into the plurality of connecting holes S3 and 251 in a state that the head drum assembly 200' is
20 turned upside down on a jig and the main base 100' is also turned upside down. Accordingly, the
21 head drum assembly 200' mounting process becomes easier and simpler.

1 **[0052]** As described above, according to the head drum assembly mounting structure of the
2 present invention, since the slant boss 250 is coupled to the main base 100' by a screw (S) which is
3 upwardly coupled from the lower portion of the main base 100', any possible damage to the lead line
4 can be basically prevented.

5 **[0053]** FIG. 11 shows a modified example of the positioning means for determining the mounting
6 position of the head drum assembly 200'. According to this embodiment, additional positioning
7 guides 271 and 272 are provided around the guiding bosses 261 and 262.

8 **[0054]** The positioning pins 271a and 272a on the ends of the positioning guides 271 and 272 are
9 connected in the connecting holes (S3) of the main base 100'. Here, the guiding bosses 261 and 262
10 include hemispheric protrusions 261b and 262b protruding from ends thereof. Accordingly, the
11 guiding bosses 261 and 262 are supported on the main base 100' in a manner that the hemispheric
12 protrusions 261b and 262b are contacted with the main base 100'. As described, since the guiding
13 bosses 261 and 262 are supported on the main base 100' by the point-contact of the hemispheric
14 protrusions 261b and 262b with the main base 100', the contact area is decreased, and the influence
15 by an evenness of the contact area is minimized. As a result, the head drum assembly can be stably
16 assembled.

17 **[0055]** As described, according to the head drum assembly mounting structure of the tape recorder
18 of the present invention, by the positioning means, the process of assembling the main base with the
19 head drum assembly becomes simpler, and the productivity is increased. Further, by an omission of
20 parts such as screws, supporting brackets, or the like, the manufacturing cost can be reduced. Further,
21 since the damage or deformation of the lead line can be prevented by an improved structure, the

1 quality stabilization can be accomplished.